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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/516,653	03/01/2000	Brian DOYLE	P8123	3216

7590

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EXAMINER

BEREZNY, NEAL

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 10/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/516,653

Applicant(s)

DOYLE, BRIAN

Examiner

Neal Berezny

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15-28 and 39-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-28 and 39-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 22 February 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Continued Prosecution Application

1. The request filed on 9/20/02 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/516,653 is acceptable and a CPA has been established. An action on the CPA follows.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

~~The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.~~

3. Claims 19-21 and 26-28 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is claimed that an etch results in an SOI structure, which is not clear how this is accomplished either in the claims or the specifications.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 9-13, 15-16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapple-Sokol et al. (5,612,255). Chapple-Sokol teaches patterning

a first oxide, fig.1A, el.102, forming poly spacers, fig.1B, el.106, by means of RIE, col.2, ln.55, forming a plurality of channels, fig.1C and 1D, el.106 and 116; forming a gate oxide, fig.2C, el.122, col.3, ln.30-32, forming a gate over the channels, fig.2C, el.124, col.3, ln.33-35, in which each channel is a one dimension quantum wire, col.3, ln.60-65. Further, Chapple-Sokol teaches the formation of sources, drains, and contacts, el.132, 134, and 136, col.3, ln.47-51, and anticipates the usage of various isolation mechanisms well known in the art, such as use of a SOI substrate, dopant under the trench, and insulator-filled trenches, col.3, ln.38-43, and would be obvious for one skilled in the art to employ such processes into the teachings of Chapple-Sokol.

6. Chapple-Sokol does not teach the practice of forming spacers on spacers to further reduce the size of the quantum wire even further. It would be obvious to one skilled in the art to merely duplicate the Chapple-Sokol process twice to further reduce the width of the wire. It has been held that a mere duplication of part or processes involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

7. Chapple-Sokol also appears not to specifically state the use of a nitride spacer mask instead of the poly spacer mask. In terms of spacer masks, nitride and poly are well known to be equivalent materials and it would be obvious to one skilled in the art to substitute one for the other and provide for greater process latitude.

8. Official notice is given that triple gate FET's are well known in the art and it would be obvious to employ multiple gate FET technology to Chapple-Sokol's quantum wire FET to provide for multiple inputs into the switching device and therefore enhance the capabilities of the device.

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9. Claims 7-8, 17, 19-28, and 39-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapple-Sokol as applied to claims 1-6, 9-16, and 18 above, and further in view of Kendall, (Kreidl Memorial Lecture, Oct. 30, 1995). Kendall teaches the art of quantum wire arrays and related geometries employing studs less than 5nm in width, last par. on page 1. Chapple-Sokol also teaches various geometries of their quantum wires, see col.3. It would be obvious to one of ordinary skill in the art to employ the claimed geometries in the teachings of both Chapple-Sokol and Kendall. It has been held that mere changes in dimensions to be within the level of one of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Further, applicant has failed to disclose the critical nature or unexpected results arising there from. One would be motivated to combine the teachings of Kendall with Chapple-Sokol in order to reduce the geometries of the QWFET to increase both performance and density of devices.

Specifications

10. The amendment filed 2/22/02 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

A. Amendment of p.2, ln.6, changes silicon to semiconductor, which broadens the specifications.

B. Amendment of p.8, beginning at ln.2 introduces limitations, plurality of channels and quantum wire, into the description of figure 1f, broadening the specifications, as originally presented.

C. Amendment of p.8, beginning at line 17, introduces additional dimensional limitations, X, P, and W, into the paragraph.

D. Amendment of p.10, beginning at line 7, introduces an additional variable, X, into the paragraph, broadening the specifications.

E. Amendment of p.10, beginning at line 17, changes the aspect ratio discussion from the quantum wire to the second nitride spacer mask. Also additional steps are included in the discussion of the process related to the structure of fig.4.

F. Amendment of p.13, beginning at line 8, includes additional steps to the original discussion of the process related to the structure of fig.7.

G. Amendment of p.14, beginning at line 1, changes the role of figure 10 from being **the inventive method to an inventive embodiment**. It changes the scope of the flow diagram from being the critical process flow of the entire invention to just one embodiment of several.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

11. Applicant's arguments filed 7/30/02 have been fully considered but they are not persuasive. Applicant asserts that etching an SOI structure produces an SOI topology. The specifications fail to sufficiently describe or define the difference between an SOI structure and an SOI topology. Applicant must provide specific support in the specifications to overcome the rejection.

12. Applicant's arguments traversing examiner's new matter objections under 35 USC 132 are not persuasive because the original specifications described a

dimensional relationship between the wire and the channels, which had changed by the plurality amendment. Further, applicant has failed to specifically cite in the original specifications where such variables are described in such a clear and unambiguous matter that would overcome the new matter objection. Applicant asserts that new matter is permitted if it is narrower in scope than the original specifications. This is incorrect, and would result in unlimited inclusion of new matter to very broad specifications. Finally, applicant's citing of the specifications to support the description of item 40 is insufficient because it teaches the channel width is horizontal, and not vertical.

13. Applicant's arguments regarding examiner's 103 rejections are not convincing. The rejection stands on its own with or without the St. Regis citing. St. Regis was cited merely for additional support of the legal point. Applicant failed to address the obviousness issue. Applicant failed to respond to or add to examiner's previous response to the applicant's teaching away assertion. Further, applicant failed to comprehend examiner's arguments and erroneously concluded that the Office action had withdrawn the assertion that nitride and poly are equivalent masking materials. Applicant failed to address examiner's full arguments, disregarding the basis of the rejection.

14. Applicant attacks the references individually when the rejection is based on the combination of both the Kendall and the Chapple-Sokol references. Kendall teaches the modification of the Chapple-Sokol process to include the geometric teachings of Kendall. Applicant provides no additional support or reasoning for the assertion that

Kendall's geometries are vague. Further, applicant seems to be arguing against a 102 rejection, when the rejection is a 103 rejection of two references. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

15. Finally, applicant's challenge to examiner's motivational statements is overcome by the Chapple-Sokol reference, col.1, ln.17-20.

CONCLUSION

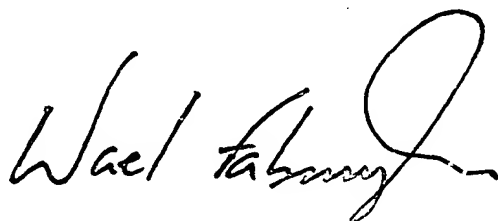
16. This is a CPA of applicant's earlier Application No. 09/516,653. All claims are drawn to the same invention claimed and entered in the earlier application, see Advisory Action, paper 12, nor has applicant responded to examiner's arguments presented in the same Advisory Action, paper 12. Applicant has failed to amend the claims or respond to the last rejection and therefore, the claims could have been finally rejected on the grounds and art of record in the next Office action of the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

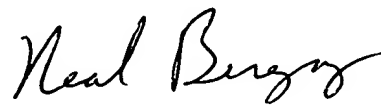
17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Neal Berezny whose telephone number is (703) 305-1481. The examiner can normally be reached on Monday to Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached at (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800


9-27-02

Neal Berezny

Patent Examiner

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